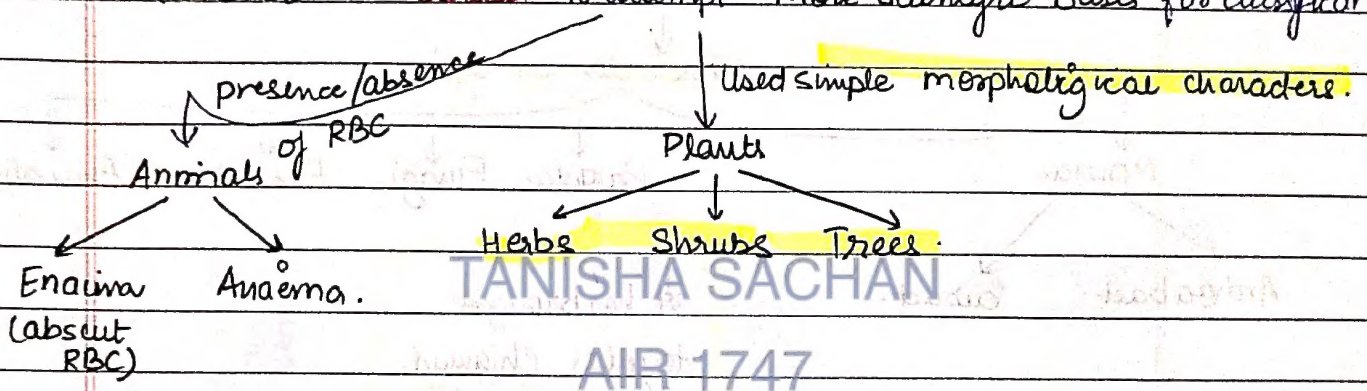


# BIOLOGICAL CLASSIFICATION

Dawn of civilisation → many attempts to classify living organisms.

↓  
Done instinctively not using the criteria that were scientific but borne out of need to use organism for our own use.  
- Food, Shelter, Clothing.

ARISTOTLE → Earliest to attempt more scientific basis for classificat.



LINNEAUS

→ Two Kingdom system of classif. → used Gross morphological characters

Plantae      Animalia

\* Did not distinguish b/w prok. & euk.

unicell. & multicell.

Photosynth. & non-photosynth.

\* Large no. of organisms did not fall into either category (plant & Animalia)

\* Besides, gross morphological charac., a need was felt to include

Cell str.

Nature of wall

Mode of nutrition

Habitat

Method of Reprod.

Evolutionary relationship

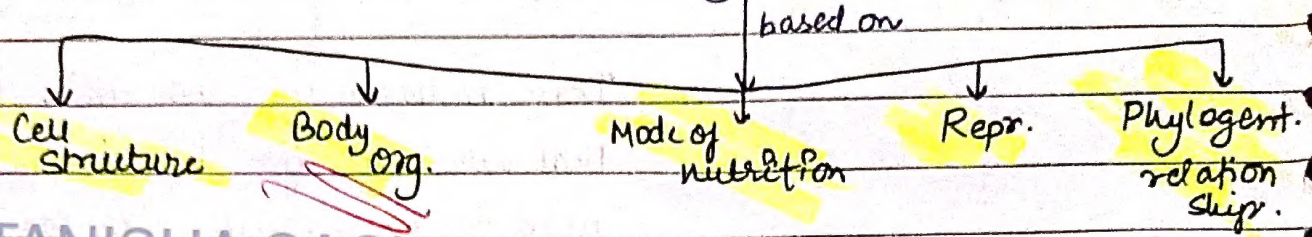
\* Classification systems for living organisms have undergone several changes over the time.

\* Though, plant kingdom & Animal kingdom → have been constant over the time, under all diff. systems

The understanding of what groups/organism be included under these kingdom have been changing, number & nature of other kingdom have been understood differently by different scientists over time.



RH Whittaker (1969) → Five Kingd. classific.

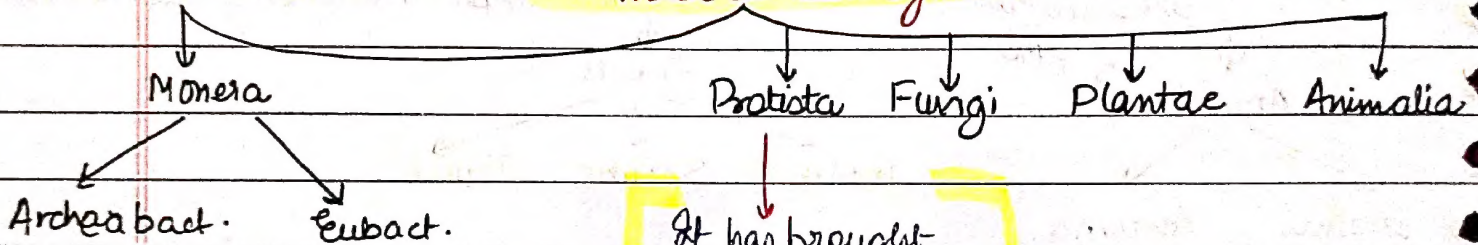


TANISHA SACHAN

AIR 174 Six kingdom Classif.

NCERT THREAD NOTES

Three domain system



It has brought together Chlamyd. & Chlorella. With Paramoecium & Amoeba.

\* Over the time an attempt has been made to evolve a classific system. which reflects not only on (1) morph. (2) physiolog. (3) & reproduct. similarities but is also phylogenetic.



# KINGDOM MONERA

Bacteria are conspicuous in nature.

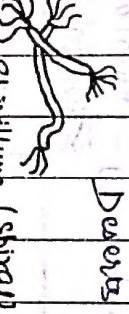
Bacteria - sole members - most abund. micro-organisms - occur almost everywhere - hundreds of Bac. in hand full of soil.

↳ can live in extreme habitats → Hot springs, Snow & deep ocean  
Deserts (where a very few other life forms can survive)

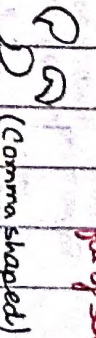


Cocci (spherical)  
Bacilli (Rod shaped)

\* Many of them live in or on other organisms as parasite.



Spirillum (spiral)



Vibrium (Comma shaped)

## EUBACTERIA

\* Thousands of true bact.  
\* Characterised by: Presence of rigid wall.  
& if motile, a flagellum

## CYANOBACTERIA:

- Blue green algae
- Have chl. a (similar to green plants)
- Photosynth. autom.
- Unicellular
- Colonial
- Filamentous
- Freshwater / marine or terrestrial algae.
- \* Capable surrounded by gelatinous sheath.
- \* Often forms bloom. in polluted water bodies
- \* Can fix atm. N<sub>2</sub> in Heterocyst.

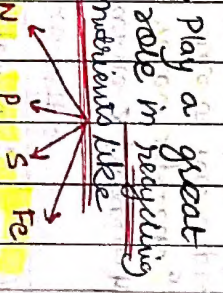
Nostoc, Anabaena.

Heterotrophic Bact. →

- 1) Most abundant in nature
- 2) majority of them decomposers
- 3) significant impact on human affairs
- 4) Antibiotic prod.
- 5) Fixing N<sub>2</sub> in legume roots

## Chemosynthetic Autotrophs?

- 1) Chlorine / inorganic
- 2) Subst. used as nitrate, nitrites & ammonia & use the released energy for their ATP prod.
- 3) Play a great role in recycling nutrients like N, P, S, Fe



Some are pathogens causing damage to human beings, crops, farm animals & pets.

- Cholera
- Typhoid
- Tetanus
- Cholera

Bacteria are conspicuous in nature.

Bact. struct. is very simple but very complex in bacter.

↳ most extensive metabolic diversity.

## Autrophic

Photosynth. Chemosynth. aut. use inorganic substance.

Heterotrophic (eat & eat majority)

## ARCHAEBACTERIA

- \* special since live in most harsh habitats survive extremely
- (1) salt areas (HALOPHILES)
- (2) Hot springs (thermoacidophiles)
- (3) marshy area (methanogens)

\* Archaeobact. differ in 1) having diff. cell structure (biogen) from rep. for survival in extreme nature

Bact. → reproduce mainly by Fission Mycoplasma &

↳ unfav. cond. → spores

- \* smallest living cell
- \* Can survive without oxygen.
- \* Pathogenic to plants
- \* Animals







Refrigerator - prevents bacterial or fungal infection

# KINGDOM FUNGI

cell wall: chitin & polysaccharide.

\* Unicellular Kingdom of heterotrophic org.

\* Common foodstuffs and mushrooms are also fungi.

\* Unicellular fungi → yeast → used in bread & beer.

\* Antibiotic source: penicillium

\* Fungi → decomposition → air → plants  
→ water → soil  
→ grow: warm & humid places.

\* With exception of Yeast, fungi are filamentous.

Network of hyphae : mycelium

Body consists of long, slender, thread like structures called hyphae.

\* Most fungi are heterotrophic

→ Saprophytes: absorb soluble organic matter from dead substrate.  
(On living plants & animals: PARASITE)

→ Symbionts: with algae as lichens  
→ Mycorrhiza: with roots of higher plant.

\* Sexual cycle of 3 steps

Plasmogamy  
Fusion of protoplasm.  
This two nuclei or non-mate gametes:

Karyogamy  
Fusion of two nuclei.

Meiosis  
in zygote  
(haploid spores)



Fungi reproduce sexually, two haploid hyphae of compatible mating type.

Immediate fusion → Diploid cell (2n)

Anterogamous dikaryotic stage → Ascidomyces

Later parental nuclei fuse & also become diploid.  
Fertile body → spores (n)

TANISHA SACHAN

AIR 1747

NCERT THREAD NOTES

\* Great diversity in morphology & habitat

\* Widespread on that → fungi (parasitic)

\* Other fungi causes disease  
→ plants → rust  
→ rust causing Puccinia

Fungi on rotten fruits

\* Some hyphae → continuous tubes filled with multinucleate cytoplasm.

Coenocytic hyphae

\* Other have → septate or even wall → in hyphae.

\* Reproduction (vegetative means)

Fragmentation  
Fission

Budding

\* Asexual Rep. : By spores

Conidia  
Sporangio spore

Zoospore.

\* Sexual Rep. :

→ oospore  
→ Basidiospore

\* Various spores are produced in distinct structures called fruiting bodies.

\* The morphology of mycelium

\* Made of spore formation

\* Fruiting bodies

forms basis of classification of fungi into various classes.



## Phycomycetes

Found in aquatic habitats

decaying wood damp places  
in moist

obligate parasite on plants

Mycelium: Aseptate & Coenocytic

Asexual Reproduction

Zoospore (motile) produced endogamously in sporangium

Aplanospore (non motile)

Zygospore: Fusion of two gametes, similar in morphology (isogamous) OR dissimilar (anisogamous)

Example: Mucor (Burg mould)

Rhizopus (Bread mould)

Albugo (parasitic fungus on mustard)

## Ascomycetes

Sac fungi

Mostly multicellular (eg. penicillium)

Rarely unicellular: Yeast (Saccharomyces)

They are saprophytic, bloom on decaying organic matter or coprophilous (growing on dung).

Mycelium: Branched & septate, in gregarious mycelium

Asexual spores → conidia

exogenously conidiophore

Sexual spores → Ascospores

Sac like (asci) endogamously arranged in diff. types of fruiting bodies

Ascomycetes of fruiting bodies

Example: Aspergillus

Claviceps

Neurospora - extensively used in biochem & genetic work.

Morels & Truffles - delicacies

## Basidiomycetes

Found on logs

Tree stumps

living plant bodies as per anther.

Mycelium: Branched & Septate.

Asexual spore: Not found generally.

Veg reproduction: Fragmentation.

Sex organs: absent.

Plasmogamy brought about by fusion of two veg. or somatic cells of diff. strains on results into dikaryon

basidia → Basidium (2 spores) & sterigmata (2 spores) produce 4 basidiospores (exogamous)

basidia arranged in fruiting body - basidiocarp

Eg. Agaricus (Mushroom)

Ustilago (smut)

Puccinia (Rust fungi)

When sexual form disjunctive - moved to class they are belonging.

Its possible that asexual & veg stage has been given the same placed under deuteromycetes.

And asexual stage under (Basidiomycetes) (Basidiomycetes)

later when linkage established, fungi identified correctly & moved out.

The deuteromycetes reproduce only by asexual spores - conidia

Mycelium Branched & septate.

Some members are saprophytic or parasitic while a large number of them are decomposers of litter & help in mineral cycling.

Eg. Alternaria, Colletotrichum, Trichoderma.



→ have prominent chloroplast.

Date \_\_\_\_\_  
 Page \_\_\_\_\_

~~Bladderwort~~

Venus  
flytrap

→ Cucurbit

• ~~Alternation of generation~~ present <sup>lythop</sup>

AIR 1747

# NCERT THREAD NOTES

• They directly or indirectly depend on the plants for food

- They digest the food in an internal cavity and store food reserves as glycogen or fat.
- Mode of nutrition : Holozoic - ingestion of food.
- Follow ~~→~~ Definite growth pattern ~~→~~ adults → definite shape & size
- Higher forms  $\begin{cases} \rightarrow \text{elaborate sensory} \\ \rightarrow \text{motor (neuromotor)} \end{cases} \rightarrow \text{mechanism.}$
- Most of them are capable for locomotion.
- Sexual reproduction followed by embryological development.

↓  
acellular.

Viruses : • Not 'truly' living (if we underst. living as those org. that have cell structure)  
Non cellular org. having inert crystalline structure outside living cell.





Date \_\_\_\_\_  
Page \_\_\_\_\_

Once they infect → Take over the machinery of host cell

↓  
To replicate themselves, killing the host.

Name: VIRUS meaning venom or poisonous fluid

Pasteur

Recognized certain microbes as casual organism of TMV (Tobacco mosaic Virus). These are smaller than bacteria & pass through bacteria proof filter.

(VIRUS)

→ D.T. Ivanowsky  
(1892)

AIR 1747

NCERT THREAD NOTES

Demonstration: Extract of infected plants of tobacco → cause infection → In healthy plants

→ M.W.

Beijerinck

(1898)

∴ Hence called, Contagium vivium fluidum (infectious living fluid)

Virus can be crystallised & crystals consists largely of proteins. They are inert outside <sup>their specific</sup> host cell.

→ W.M Stanley  
(1935)

Virus are obligate parasite.

\* In addition to proteins, viruses also contain genetic material, could be EITHER RNA or DNA.

Virus → nucleoprotein → genetic material infectious



TANISHA SACHAN

AIR 1747

NCERT THREAD NOTES

~~IMP~~ Virus infecting plant → ssRNA

~~IMP~~ Virus infecting animals → ss or ds RNA  
OR  
ds DNA

~~IMP~~ Bacterial virus / Bacteriophages → Usually dsDNA

Protein coat : Capsid : made of small subunits capsomeres  
↓ protects  
Nucleic acid.

arranged in helical  
or polyhedral form  
(geometric form).

Viral Disease : Mumps, Small pox  
Herpes, Influenza  
AIDS } In animals

In plants

↓ Dying  
↓ mosaic formation  
↓ stunted growth  
↓ vein clearing  
↓ leaf rolling & curling  
↓ yellowing

Viroids : 1971, T.O. Diener

Infectious particle smaller than virus

Caused Potato spindle tuber Disease

Free (RNA) → of low molecular weight

Lacks protein Coat

Prions : In modern medicine, certain infectious neurological diseases were found to be transmitted by an agent consisted of abnormally folded protein.  
• Size similar to virus



Diseases: Bovine Spongiform encephalopathy

← (BSE) → Mad cow disease in cattle  
most notable disease

↓ analogous variant

Cr - Jacob disease (CJD) in humans

↖ also mutualism

Lichens & Symbiotic associations - mutually useful

Algae

Phycobiont

↓  
Autotrophs

↓  
Prepare food for fungi

Fungi

Mycobiont

↓  
Heterotrophs

↓  
Provide Shelter,  
absorb mineral nutrients  
& water.

Lichens are so close in their association, indistinguishable

↳ Very good pollution indicators

TANISHA SACHAN

AIR 1747

NCERT THREAD NOTES